AMPROBE®

ACD-22SW
ACD-23SW

Digital Clamp Meter

Users Manual

- Mode d’emploi
- Bedienungshandbuch
- Manual d’Uso
- Manual de uso

AMPROBE®

ACD-22SW

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Digital Clamp Meter

English

Users Manual

October 2010, Rev.1
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Limited Warranty and Limitation of Liability
Your Amprobe product will be free from defects in material and workmanship for 1 year from the date of purchase. This warranty does not cover fuses, disposable batteries or damage from accident, neglect, misuse, alteration, contamination, or abnormal conditions of operation or handling. Resellers are not authorized to extend any other warranty on Amprobe's behalf. To obtain service during the warranty period, return the product with proof of purchase to an authorized Amprobe Test Tools Service Center or to an Amprobe dealer or distributor. See Repair Section for details. THIS WARRANTY IS YOUR ONLY REMEDY. ALL OTHER WARRANTIES - WHETHER EXPRESS, IMPLIED OR STAUTORY - INCLUDING IMPLIED WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE OR MERCHANTABILITY, ARE HEREBY DISCLAIMED. MANUFACTURER SHALL NOT BE LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES OR LOSSES, ARISING FROM ANY CAUSE OR THEORY. Since some states or countries do not allow the exclusion or limitation of an implied warranty or of incidental or consequential damages, this limitation of liability may not apply to you.

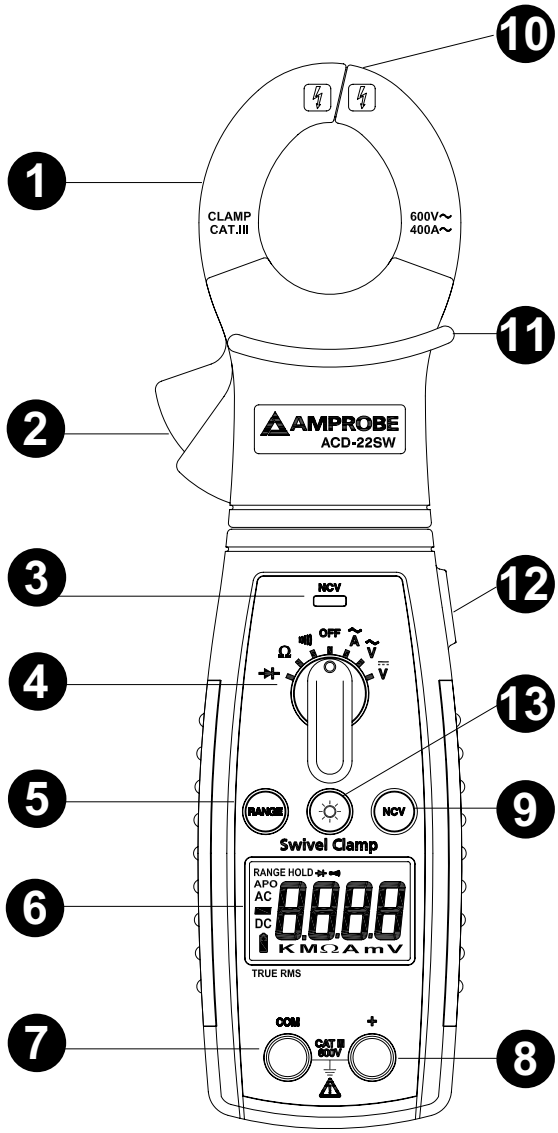
Repair
All test tools returned for warranty or non-warranty repair or for calibration should be accompanied by the following: your name, company's name, address, telephone number, and proof of purchase. Additionally, please include a brief description of the problem or the service requested and include the test leads with the meter. Non-warranty repair or replacement charges should be remitted in the form of a check, a money order, credit card with expiration date, or a purchase order made payable to Amprobe® Test Tools.

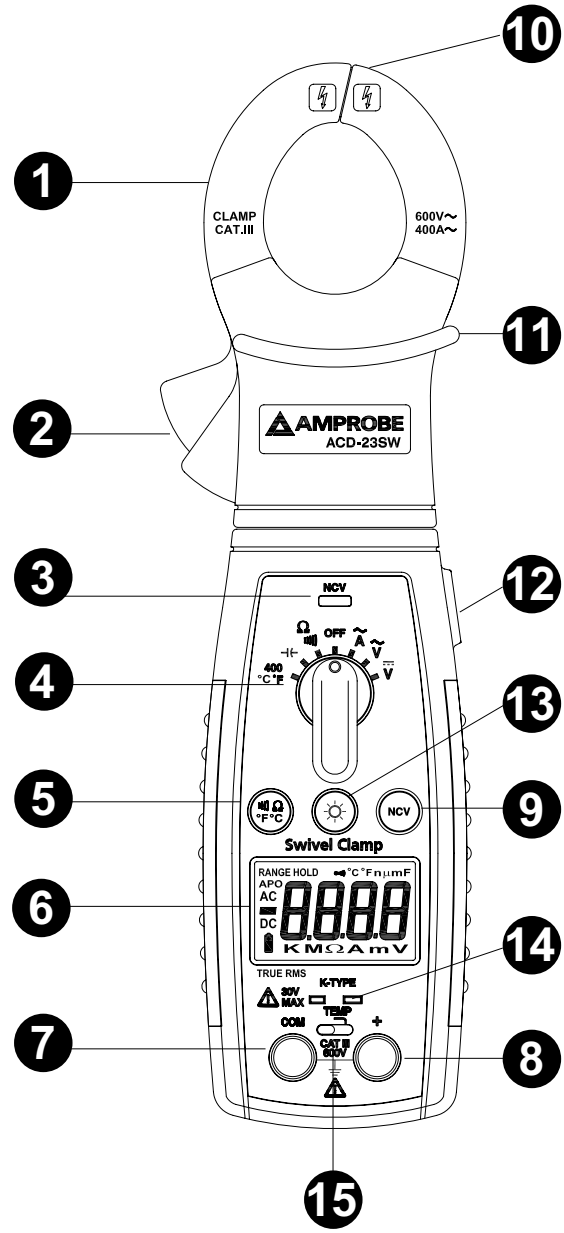
In-Warranty Repairs and Replacement – All Countries
Please read the warranty statement and check your battery before requesting repair. During the warranty period any defective test tool can be returned to your Amprobe® Test Tools distributor for an exchange for the same or like product. Please check the "Where to Buy" section on www.amprobe.com for a list of distributors near you. Additionally, in the United States and Canada In-Warranty repair and replacement units can also be sent to a Amprobe® Test Tools Service Center (see below for address).

Non-Warranty Repairs and Replacement – US and Canada
Non-warranty repairs in the United States and Canada should be sent to a Amprobe® Test Tools Service Center. Call Amprobe® Test Tools or inquire at your point of purchase for current repair and replacement rates.

In USA	In Canada
Amprobe Test Tools	Amprobe Test Tools
Everett, WA 98203	Mississauga, ON L4Z 1X9
Tel: 888-993-5853	Tel: 905-890-7600
Fax: 425-446-6390	Fax: 905-890-6866

Non-Warranty Repairs and Replacement – Europe
European non-warranty units can be replaced by your Amprobe® Test Tools distributor for a nominal charge. Please check the "Where to Buy" section on www.amprobe.com for a list of distributors near you.
Amprobe® Test Tools Europe
In den Engematten 14
79286 Glottertal, Germany
tel: +49 (0) 7684 8009 - 0
*(Correspondence only – no repair or replacement available from this address. European customers please contact your distributor.)





1. Current Jaws
2. Jaw Opening Lever
3. NCV LED indicator
4. Function Selector Knob
5. Range Push button (ACD-22SW)/ Auxiliary Feature push button selector(ACD-23SW)
6. LCD Display 3 ¾ digit with 3999 counts
7. Common (Ground reference) Input jack for all functions EXCEPT clamp-on ACA current function
8. Input jack for all functions EXCEPT clamp-on ACA current function
9. NCV Push button function
10. NCV Sensor
11. Hand/Finger Barrier to indicate the limits of safe access of the meter during measurement
12. Hold Push button function
13. Backlight Push button
14. Input jacks for temperature measurement
15. Temperature Slide Knob

CONTENTS

SYMBOLS 2
Safety Information 2
UNPACKING AND INSPECTION 4
INTRODUCTION 4
OPERATION 5
°F/°C/)))/Ω Button 5
HOLD Button 5
RANGE Button 5
Backlight Button 5
Auto Power off (APO) 5
Measuring DC Voltage 5
Measuring AC Voltage 5
AC Current Measurement 6
Capacitance Measurement (ACD-23SW only) 6
Resistance 6
Continuity Testing 7
Diode Testing (ACD-22SW) 7
Temperature Measurement (ACD-23SW only) 7
Non-Contact Voltage Indicator 8
Auto Power off (APO) 8
Cancellation of Auto Power off feature: 8
SPECIFICATIONS 8
AC Volts 9
AC Current 9
Resistance 9
Capacitance (ACD-23SW only) 10
Temperature (ACD-23SW only) 10
Continuity 10
(NCV) Non-Contact Voltage Indicator 10
Battery Replacement 11
MAINTENACE AND REPAIR 11

SYMBOLS

	Battery		Refer to the manual
	Double Insulated		Earth Ground
	Alternating Current		Direct Current
	Complies with EU directives		Audible tone
	Application around and removal from hazardous live conductors is permitted		Conform to relevant Australian standards
	Do not dispose of this product as unsorted municipal waste		Canadian Standards Association (NRTL/C)

Safety Information

- The ACD-22SW and ACD-23SW True RMS swivel Clamp meters conform to EN61010-1:2001; EN61010- 2-032:2002; CAT III 600 V, class II and pollution deg.2
- This instrument is EN61010-1 certified for Installation Category III (600V). It is recommended for use in primary supply lines, overhead lines and cable systems and distribution level and fixed installations, as well as lesser installations.
- Do not exceed the maximum overload limits per function (see specifications) nor the limits marked on the instrument itself. Never apply more than 600Vdc / 600 V ac rms between the test lead and earth ground.

⚠*Warnings and Precautions*

- Before and after hazardous voltage measurements, test the voltage function on a known source such as line voltage to determine proper meter functioning.
- Disconnect the test leads from the test points before changing meter functions.
- Disconnected from the meter's test leads before measuring current.
- Inspect the Clamp meter, test leads and accessories before every use. Do not use any damaged part.
- Never ground yourself when taking measurements. Do not touch exposed circuit elements or test probe tips.

- Do not operate the instrument in an explosive atmosphere.
- To reduce the risk of fire or electric shock, do not expose this product to rain or moisture.
- The meter is intended only for indoor use. To avoid electrical shock hazard, observe the proper safety precautions when working with voltages above 60 VDC, 42.4 Vpk, or 30 VAC rms. These voltage levels pose a potential shock hazard to the user.
- Before and after hazardous voltage measurements, test the voltage function on a known source such as line voltage to determine proper meter functioning.
- Keep your hands/fingers behind the hand/finger barriers (of the meter and the test leads) that indicate the limits of safe access of the hand-held part during measurement.
- Inspect test leads, connectors, and probes for damaged insulation or exposed metal before using the instrument. If any defects are found, replace them immediately.
- This Clamp-on meter is designed to apply around or remove from un-insulated hazardous live conductors. Individual protective equipment must be used if hazardous live parts of the installation could be accessible.
- Exercise extreme caution when: measuring voltage >20 V // current >10 mA // AC power line with inductive loads // AC power line during electrical storms // current, when the fuse blows in a circuit with open circuit voltage >600 V // servicing CRT equipment.
- Remove test leads before opening the case to change the battery.
- Disconnect circuit power and discharge all high-voltage capacitors before testing resistance, continuity, diodes, or capacitance.
- To avoid false readings, which could lead to possible electric shock or personal injury, replace the batteries as soon as the low battery indicator ( ) appears.
- To avoid electric shock hazard, do not use the HOLD mode to determine if a circuit is live. Unstable readings will not be captured and displayed.

⚠CAUTION

For non-invasive ACA current measurements, clamp the jaws around only one single conductor of a circuit for load current measurement. More than 1 conductor will cause false readings

UNPACKING AND INSPECTION

Your shipping carton should include:

1 ACD-22SW or ACD-23SW TRMS Swivel Clamp Meter

1 Set of Test leads

1 Soft Carrying Case

1 Users Manual

1 Type K Thermocouple probe (Model ACD-23SW only)

2 1.5V AAA Batteries (Installed)

If any of the items are damaged or missing, return the complete package to the place of purchase for an exchange.

INTRODUCTION

The ACD-22SW and ACD-23SW True RMS clamp-On meters come with a new patented rotating head design that allows easy viewing of the measurements in tight or inconvenient to reach places. Simply rotate the body of the meter to get an unobstructed view of the LCD display. Rich set of features and CAT III 600V safety reading for use in electrical and HVAC applications.

The features include:

- 180 degree rotating head for the perfect display viewing
- Advanced VoltTect non-contact voltage detection
- Slim jaw design with one hand operation
- Auto ranging measurement of AC Current up to 400 ACA, AC/DC Voltage up to 600V, Resistance and Capacitance(ACD-23SW only)
- Temperature measurement (ACD-23SW only)
- Audible continuity
- Auto and manual ranging respectively for quick checks and precise measurements
- Auto power off
- Data hold
- Diode Test (ACD-22SW only)
- Accommodates conductors up to 1.18” (30mm) in diameter
- Safety CAT III 600 V

OPERATION

AUXILIARY FEATURES Push Button

°F/°C/))))/Ω Button (ACD-23SW only) °F/°C/))))/Ω

Use the "°F / °C " button to select the °F or °C Temperature ranges.
Use the "))))/Ω" button to select the Resistance or Continuity ranges
HOLD.

HOLD Button

Data hold freezes the reading present on the LCD at the moment the button is pressed.To use this menu feature, set up the meter for the type of measurement and range desired.
Connect the test leads to the circuit / component to be measured and then press "**HOLD**" push button. The LCD reading will freeze and display "**HOLD**". You may now remove the test leads and the reading will not change until you press Hold again.

RANGE Push Button

This function allows the user to select the range of a function that does not show "**RANGE**" on the LCD.

BACKLIGHT Button

Backlight auto-off approx. 60 sec.

Auto Power Off (APO)

This meter will automatically turn the power off after 10 minutes. To disable the APO, set the meter to off position, press and hold the (☼ BACKLIGHT) button while turning the rotary knob to the desired range position. Release the button when LCD displays normally. Note "**APO**" annunciator is missing from the LCD.

Measuring DC Voltage

1. Set the Function Switch to V⎓
2. Connect the test leads: Red to +, Black to COM.
3. Connect the test probes to the circuit test points. ***Refer to Fig.1***
4. Read the display. If necessary, correct any overload (OL) conditions.

Measuring AC Voltage

1. Set the Function Switch to V~.
2. Connect the test leads: Red to +, Black to COM.
3. Connect the test probes to the circuit test points. ***Refer to Fig.2***

4. Read the voltage on the primary display and the frequency on the secondary display. If necessary, correct any overload (OL) conditions.

AC Current Measurement

1. Set the Function Switch to position Ã.
2. Open spring-loaded clamp by pressing the jaw opening lever on the left side of meter.
3. Position clamp around one wire or conductor. Release the jaw opening lever. Wire should be center inside the jaws. ***Refer to Fig.3***
4. Read the current on the primary display and the frequency on the secondary display. If necessary, correct any overload (OL) conditions.

Capacitance Measurement (ACD-23SW only)

When testing a capacitor that is part of a circuit, if "**dS.C**" is displayed on the screen, a voltage is present. Discharge the capacitor before testing.

1. Sett the Function Switch to " ⊣⊢ " position.
2. Connect the test leads: Red to +, Black to COM.
3. Connect the test probes to the circuit test points. ***Refer to Fig. 4***
4. Read the display. If necessary, correct any overload (OL) conditions.

> ⚠ ***CAUTION***
>
> Using the Resistance or Continuity function in a live circuit will produce false results and may damage the instrument. In most cases the suspected component must be disconnected from the circuit to obtain an accurate reading.

Resistance

1. Set the Function Selector knob Switch to Ω (ACD-22SW) or Ω /))) (ACD-23SW) to select the resistance test. Use the Auxiliary features push button (**°F/°C/**)))**/Ω**) to select resistance (ACD-23SW)
2. **Connect the test leads:** Red to +, Black to COM.
3. Turn off power to the circuit being measured. Never measure resistance across a voltage source or on a powered circuit.
4. Discharge any capacitors that may influence the reading.
5. Connect the test probes across the resistance. ***Refer to Fig.5***
6. Read the display. If OL appears on the highest Range, the resistance is too large to be measured or the circuit is an open circuit.

Continuity Testing

1. Set the Function Selector knob Switch to))) (ACD-22SW) or "Ω /))) " to select the continuity test. Use the Auxiliary features push button (**°F/°C/)))/Ω**) to select continuity (ACD-23SW)
2. Connect the test leads: Red to +, Black to COM.
3. Turn off power to the circuit being measured.
4. Discharge any capacitors that may influence the reading.
5. Connect the test probes across the resistance or the two points of test
6. Listen for the tone that indicates continuity (< 25Ω).

Diode Testing (ACD-22SW)

1. Set the Function Swith to " ⇥ " position.
2. Connect the red test lead to the "VΩ" jack and the black test lead to the "**COM**" jack.
3. Turn off power to the circuit under test. External voltage across the components may cause invalid readings.
4. Connect the probes to the diode. A forward-voltage drop is about 0.6V (typical for a silicon diode).
5. Reverse probes connection with the diode. If the diode is good, "**OL**" isdisplayed. If the diode is shorted, "**0.00**" or another number is displayed.
6. If the diode is open, "**OL**" is displayed in both directions.
7. **Audible Indication:** Less than 0.25Ω.

Temperature Measurement (ACD-23SW only)

1. Verify that the location being tested is not electrically energized.
2. Set the Function Switch to 400°C°F position.
3. Move the slide knob to the TEMP position. Insert the thermocouple plug matching the slot widths.
4. Connect the thermocouple bead to the test point. ***Refer to Fig.6***
5. Read the display. If OL appears on the display, the temperature is too large to be measured or the thermocouple is open.
6. Use the Auxiliary feature (**°F/°C/)))/Ω**) push button to select ˚C or ˚F.

Note: The test leads must be removed to move the slide plate to allow the thermocouple to be inserted.

Non-Contact Voltage Indicator

1. Remove the test leads from the meter. Push the "**NCV**" button at any selected function/Range. Then the display will be shut down and LED flashes with a short "**chirp**" sound for self-test. ***Refer to Fig. 7***
2. With the NCV tab on the tip of the clamp close to an AC voltage, Press the "**NCV**" button, the NCV LED will light and the beeper will beep. The closer you get to AC voltage, the louder the beep.

Auto Power off

1. **Auto power off:** approx. 10 minutes.
2. After auto power off, press any button to restart the meter, and the reading of measurement will be maintained in the display.

Cancellation of Auto Power off feature:

- Press and hold the (☼ BACKLIGHT) button while rotating function switch from off to any position to turn the meter on.
- The auto power off feature is disabled.
- Note "**APO**" annunciator is missing from the LCD.

SPECIFICATIONS

Display: 3¾ digit liquid crystal display (LCD) with a maximum reading of 3999.

Polarity: Automatic, positive implied, negative polarity indication.

Over range: (OL) or (-OL) is displayed.

Zero: Automatic.

Low battery indication: The " ▬+ " is displayed when the battery voltage drops below the operating level.

Measurement rate: 2 times per second, nominal.

Auto power off: Approx. 10 minutes.

Operating environment: 0°C to 50°C(32°F to 122°F) at < 70% relative humidity.

Storage temperature: -20°C to 60°C(-4°F to 140°F) at < 80% relative humidity.

Accuracy: Stated accuracy at 23°C±5°C, <75% relative humidity.

Temperature Coefficient: 0.1 × (specified accuracy) per °C. (0°C to 18°C, 28°C to 50°C).

Altitude: 6561.7 Feet (2000m).

Jaw opening capability: 30mm conductor.

Power: 1.5 volt battery x2, R03/SIZE AAA.

Power: Single standard 1.5-volt "AAA" battery x2 (NEDA 24A).

Battery life: Typically 50 hours with carbon-zinc; 100 hour with alkaline.

Dimensions: 240 × 70 × 41 mm (9.5 x 2.8 x 16 IN).

Weight: Approx. 7.7 oz. (220g).

DC Volts (Auto Ranging)

Ranges	Accuracy
400.0mV, 4.000V, 40.00V, 400.0V, 600V	± (0.5% rdg + 2 dgts)

400mV range (ACD-22SW only)

Input impedance: 400mV:>100MΩ; 4V:10MΩ; 40V to 600 V: 9.1 MΩ

Overload protection: 600 VDC or AC rms

AC Volts (TRUE RMS) (Auto Ranging)

Ranges	Resolution	Accuracy
4V, 40V, 400V	50 to 500 Hz	± (1.2% rdg + 8 dgts)
600V	50 to 500 Hz	± (1.5% rdg + 8 dgts)

Crest Factor: ≤3

AC coupled true rms specified from 5% to 100% range

Input impedance: 4 V:10 MΩ; 40 V to 600 V: 9.1 MΩ

Overload protection: 600 VDC or AC rms

AC Current (TRUE RMS) (Auto Ranging)

Ranges	Frequency	Accuracy
40.00A, 400.00A	50 to 60 Hz	± (2.0% rdg + 10 dgts)

Crest Factor: ≤3

AC coupled true rms specified from 5% to 100% range

Overload protection: 400A AC

Resistance (Auto Ranging)

Ranges	Accuracy
400.0Ω, 4.000kΩ, 40.00kΩ, 400.0kΩ	± (1.0% rdg + 5 dgts)

4.000MΩ	± (1.5% rdg + 5 dgts)
40.00MΩ	± (3.0% rdg + 5 dgts)

Open circuit volts: -0.45V dc typical, (-1.2Vdc on 400Ω range)
Overload protection: 600VDC or AC rms

Capacitance (ACD-23SW only) (Auto Ranging)

Ranges	Accuracy
4.000µF	±(3.0% rdg + 15 dgts)
40.00µF, 400.0µF	±(3.0% rdg + 5 dgts)
4.000mF	±(5.0% rdg + 20 dgts)

Minimum input range: >100nF
Overload protection: 600VDC or AC rms

Temperature (ACD-23SW only)

Ranges	Accuracy
0.0°C to 400.0°C	± (1.0% + 1°C)
-35.0°C to 0.0°C	± (2.0% + 3°C)
32.0°F to 400.0°F	± (1.0% + 2°F)
-30.0°F to 32.0°F	± (2.0% + 6°F)

Sensor type: K-type thermocouple
Overload protection: 30V Max

Diode Test (ACD-22SW only)

Test current: 0.8 mA (approximate)
Accuracy: ± (3.0% rdg + 3 dgts)
Open circuit volts: 3.0 Vdc typical

Continuity

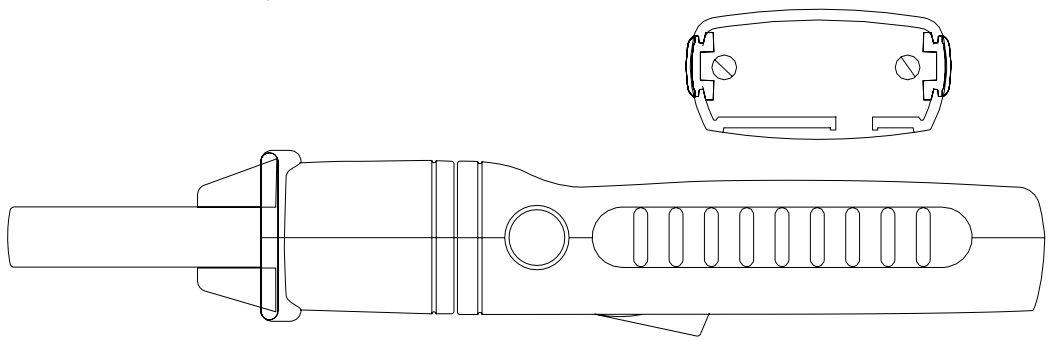
Range: 400Ω
Resolution: 1Ω
Audible indication: Less than 25Ω
Response time: 500ms
Overload protection: 600VDC or AC rms

Non-Contact Voltage Indicator (NCV)

AC Volts: 70V to 600VAC (50Hz to 60 Hz)
Red LED and Audible Indicator

Battery Replacement

- Power is supplied by 1.5 volt battery x2 (LR03/SIZE AAA).
- The " ▮ " appears on the LCD display when replacement is needed.
- To replace the battery, remove the two screws from the back of the meter and lift off the front case.
- Remove the battery from case bottom.



MAINTENACE AND REPAIR

If there appears to be a malfunction during the operation of the meter, the following steps should be performed in order to isolate the cause of the problem.

1. Check the battery. Replace the battery immediately when the symbol " ▮ " appears on the LCD.
2. Review the operating instructions for possible mistakes in operating procedure.

Except for the replacement of the battery, repair of the meter should be performed only by a Factory Authorized Service Center or by other qualified instrument service personnel. The front panel and case can be cleaned with a mild solution of detergent and water. Apply sparingly with a soft cloth and allow to dry completely before using. Do not use aromatic hydrocarbons or chlorinated solvents for cleaning.

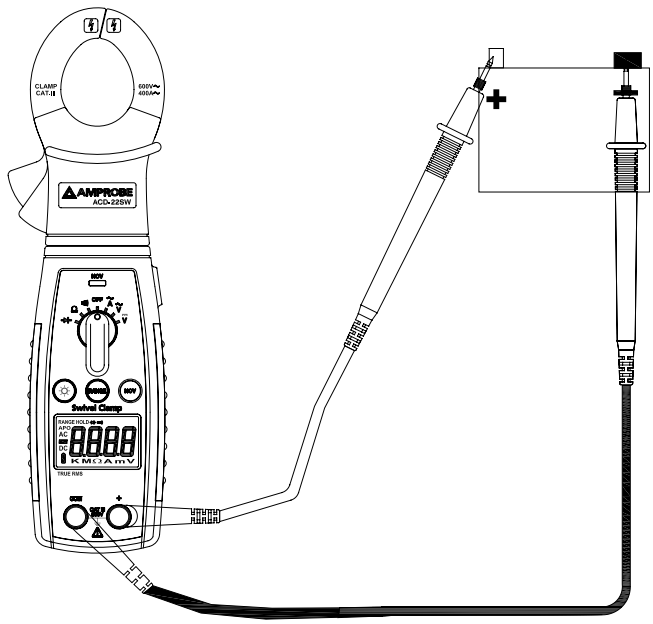


Fig.1 Measuring DC Voltage

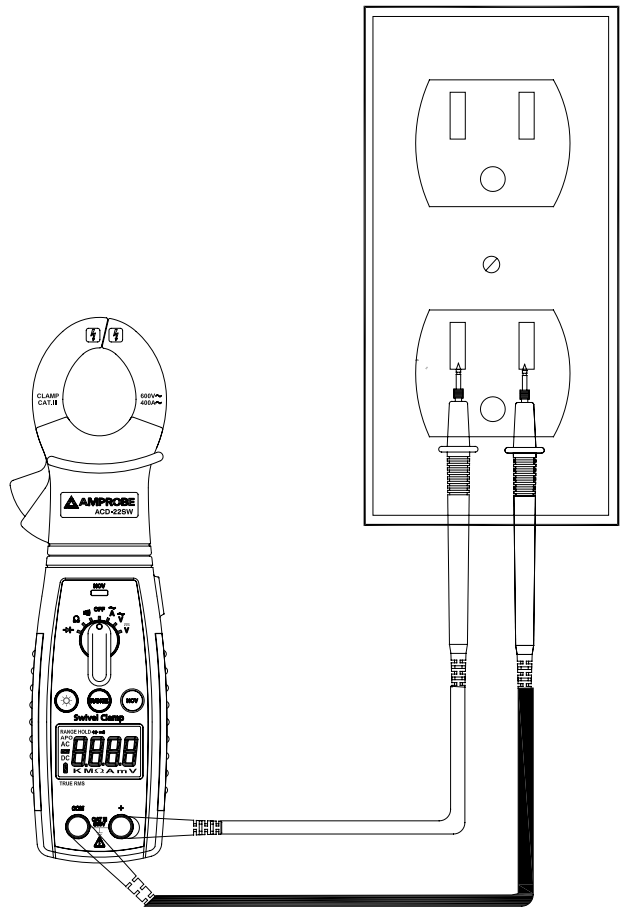


Fig.2 Measuring AC Voltage

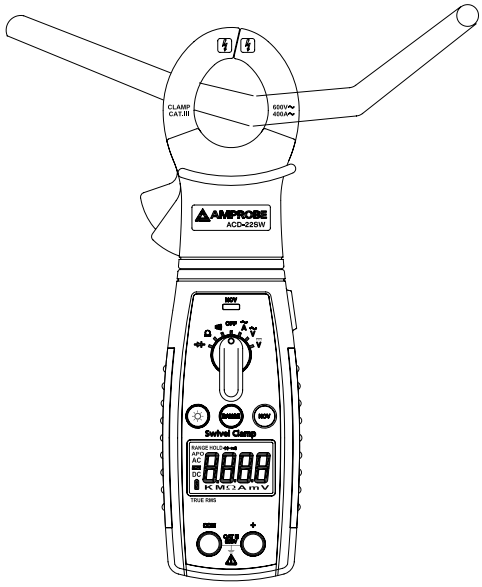


Fig.3 Measuring AC Current

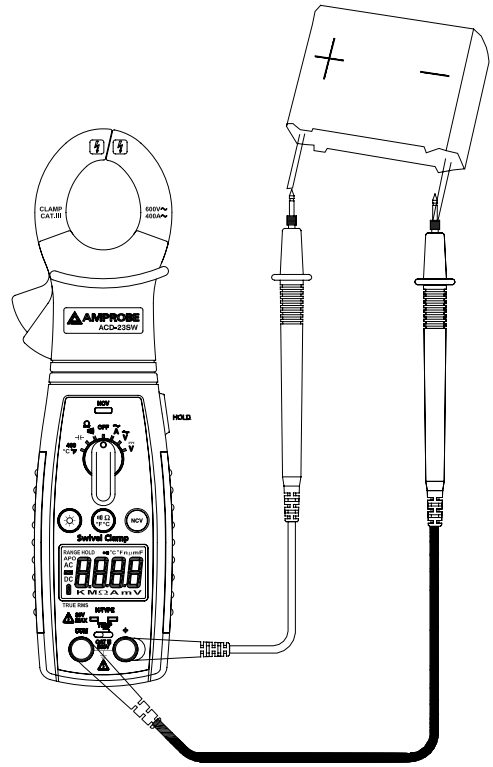


Fig.4 Measuring Capacitance

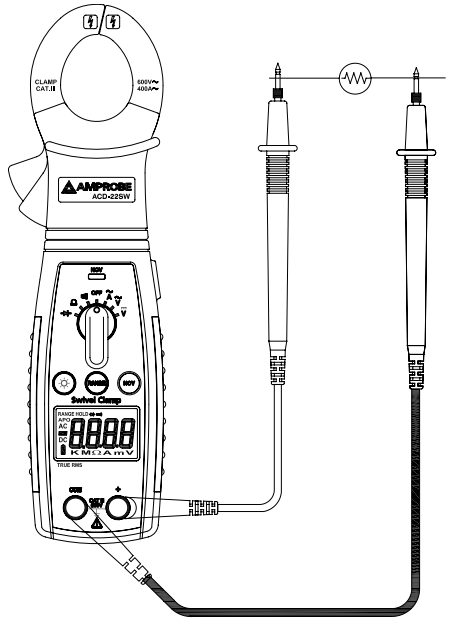


Fig.5 Measuring Resistance

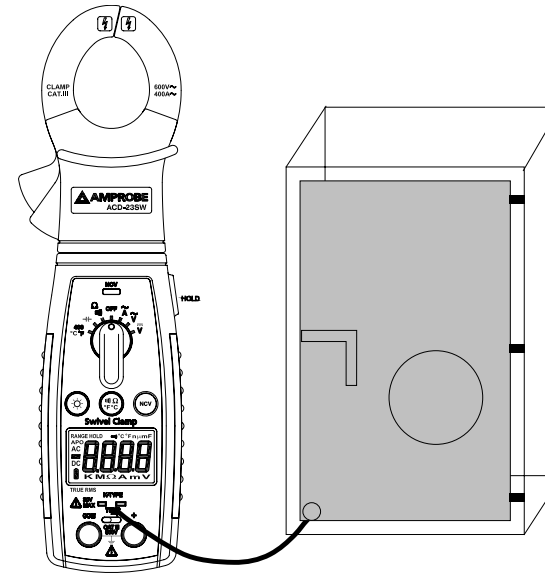


Fig.6 Measuring Temperature

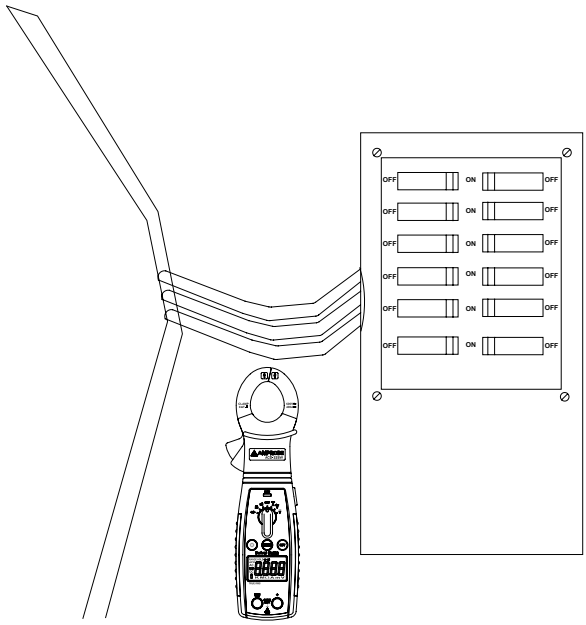


Fig.7 Non-Contact voltage (NCV) Measurement

Visit www.Amprobe.com for

- Catalog
- Application notes
- Product specifications
- User manuals

Please Recycle